omitted from the list of allowed claims and are also deemed to be allowable by the examiner.

2. Claims 1, 2, 13 and 14 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. 5,625,399 ("Wiklof et al.). In support of the rejection the examiner has asserted that Wiklof et al. teaches a method, and a thermal printer, in which the method is practiced, which includes the steps of applicants' method as recited in claims 1 and 2 and has referred to column 10, lines 10 - 20 of the reference.

Applicants traverse this ground of rejection. The reference does not teach each and every step of applicants' advantageous method for computing an input energy to provide to a thermal print head element.

Applicants' advantageous method, as defined in claim 1 includes the step of:

(A) computing an input energy to provide to the print head element

based on a current temperature of the print head element and a

plurality of one-dimensional functions of a desired output density

to be printed by the print head element.

Claim 2 is dependent on claim 1 and recites the further step of: (B) providing the input energy to the print head. Claims 13 and 14 are drawn to a thermal printer that includes a thermal print head and, respectively, means for carrying out the method steps recited in claims 1 and 2.

To reiterate, the method recited in claim 1, includes the step of computing the input energy based on a current temperature of the print head element and a plurality of one-dimensional functions of a desired output density to be printed at each point, or pixel, of the printed image. In essence, according to the method of applicants, the use of a multiplicity of one-dimensional functions in the manner described in detail in the application permits the printer to print an image containing spatially-varying image density and to produce the image density accurately at each point. Each location in the image has a "target", or desired, density value to be printed, and the invention describes a method for achieving these targets.

Applicants' printer can print gray scale images and the quality of images of this type is particularly sensitive to errors in thermal history control. Applicants have provided a method, and a printer for carrying out the method, of higher-accuracy thermal history control and this method uses a plurality of one-dimensional functions of the desired output density at each point, or pixel, of the printed image. The method of

applicants can also be used to print images having the same density at each point of the printed image using the plurality of one-dimensional functions of desired output density.

In applicants' printer, the amount of energy provided to each print head element during a print head cycle is based on the plurality of one-dimensional functions of the desired output density and on the temperature of a print head element at the beginning of the print head cycle. Applicants' method can increase or decrease the input energies as appropriate for the desired output densities.

This is in contrast to the printer of Wiklof et al. that is designed to print a single output density. This reference describes a method of maintaining constant print density with a correction based on the past and future states (ON or OFF) of the pixel to be corrected and its neighboring pixels. The correction depends only on the state of these pixels and not on the desired output density. A function of the desired output pixel density, in fact, would not be meaningful in this case as there is only one desired value of pixel density.

At column 10, lines 10 - 20 of Wiklof et al it is stated that "the response applied to a particular print element is a function not only of the past and future activity of the present and adjoining print elements, but also a function of such parameters as print speed, media

type, ambient temperature, heat sink temperature, personal darkness preference, power supply voltage and print head average print element resistance." These are not "one dimensional functions of a desired output density" as are utilized in the method and apparatus of applicants. The only reference to density in Wiklof et al is "personal darkness preference" which is described as being specified through a keypad entry. Again, this does not provide a one-dimensional function of a desired output density for each print head element.

It is apparent that Wiklof et al does not teach each and every element of the subject matter recited in claims 1, 2 13 and 14. In essence, this reference teaches a method of maintaining a constant print density based on the past and future states of the heating element and its neighboring elements. It allows the user to reproduce a single print density that is preferred by the user and that can be adjusted by a keypad entry. This is in contrast to applicants' printer which prints gray scale images or single density images and determines the amount of energy to provide to each print head element during a print head cycle based on temperature and on a plurality of one-dimensional functions of a desired printed density at each pixel.

Reconsideration of this ground of rejection and withdrawal thereof are respectfully requested.

3. Claims 3, 4, 5, 15, 16 and 17 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Wiklof et al in view of U.S. 4,391,535 ("Palmer"). In support of the rejection the examiner has stated that Palmer teaches a method and apparatus for estimating the temperature of a print head element using the ambient temperature and an energy provided to the print head element and has concluded that it would have been obvious to one of ordinary skill in the art at the time the present invention was made combine the teachings of Wiklof et al and Palmer to control the input energy provided to a print head element.

Applicants traverse this ground of rejection. The disclosures of the references do not teach or suggest the claimed subject matter within the meaning of Section 103(a).

The distinctions between applicants' claimed subject and the disclosure of Wiklof et al have been discussed above. The teaching of Palmer does not render the rejection any more effective.

Palmer describes a bar code printer with a single bar-shaped pixel. The temperature of the print head is estimated by creating a simple analog electrical circuit that emulates the thermal properties of the print head. Palmer does teach a method which attempts to simulate the print head temperature variations and correct for them. However, this is done in the context of a printer that prints only constant density and not gray scale images.

Thus, there is no teaching of thermal history correction based on functions of the desired output density of the pixel(s).

Reconsideration of this ground of rejection and withdrawal thereof are respectfully requested.

4. Applicants acknowledge the indication of allowable subject matter in claims 6 - 12 and 16 - 22.

5. Since claims 1 - 5 and 13 - 17 have been shown to be patentably distinguishable over the references of record, it is submitted that claims 1 - 22 are patentable.

In summary, all the claims in the application are proper in form for allowance and in substance are directed to subject matter which is patentably distinguishable over the references of record. Reconsideration of the application and allowance of all the claims are respectfully solicited.

Respectfully submitted,

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CERTIFICATE OF MAILING

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date: January 15, 2004

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